

**U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE**

SPECIFICATION

**SHROUD, FACE AND NECK,
WILDLAND FIRE**

1. SCOPE

1.1 Scope. This specification covers the requirements for flame-resistant face and neck shrouds for use by wildland firefighters.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

SPECIFICATIONS

FEDERAL

A-A-55126 - Fastener Tapes, Hook and Pile, Synthetic
A-A-55217 - Thread, Aramid, Spun Staple

USDA FOREST SERVICE

5100-87 - Cloth, Shirting, Aramid

STANDARDS

FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies)
FED-STD-376 - Preferred Metric Units for Use By the Federal Government

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294 by using the Specification Comment Sheet at the end of this document or by letter.

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(Unless otherwise indicated, copies of federal and military specifications, and standards are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094. Copies of Forest Service specification 5100-87 are available from USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those in effect on the date of the invitation for bids or request for proposals (see 6.2).

DRAWINGS

USDA FOREST SERVICE

MTDC-989 - Shroud, Face and Neck, Wildland Fire

(Copies are available from the USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59804-7294.)

2.2 Non-Government publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals (see 6.2).

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

Z1.4 - Sampling Procedures and Tables for Inspection by Attributes

(Copies are available from the American Society for Quality Control, 611 East Wisconsin Avenue, Milwaukee, WI 53202.)

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

Photographic Comparative Rating of Single and Double Needle Seams
(Method 88B, two photos)

(Address requests for copies to the American Association of Textile Chemists and Colorists, P.O. Box 12215, Research Triangle Park, NC 27709.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1974 - Standard Practice for Methods of Closing, Sealing, and Reinforcing
Fiberboard Shipping Containers
D 3951 - Standard Practice for Commercial Packaging
D 5118 - Standard Practice for Fabrication of Fiberboard Shipping Boxes
D 6193 - Standard Practice for Stitches and Seams

(Copies are available from ASTM, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.)

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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1977 - Protective Clothing and Equipment for Wildland Fire Fighting

(Copies can be obtained from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Copies are available from American Trucking Associations, Inc., 2200 Mill Rd., Alexandria, VA 22314.)

(Non-Government standards and other publications normally are available from the organizations that prepare and distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), the shroud be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 NFPA. Due to the limited number of ISO registered contractors, the contract shall specify whether the shroud is to be labeled as NFPA 1977 compliant.

3.2.1 Full NFPA compliance. When so specified, the shroud shall meet the requirements of NFPA 1977 and shall be tested, labeled, and certified as in compliance with NFPA 1977 (see 3.3.11.1).

3.2.2 NFPA non-compliance. When so specified, the shroud shall meet the requirements of NFPA 1977 with exception of the ISO registration and labeling requirements. The shroud shall be tested in accordance with NFPA 1977 and shall be labeled as specified by 3.3.11.2.

3.3 Materials and components. Materials and components shall be as specified herein and in the applicable drawing, MTDC-989. In addition, the materials and components shall comply with NFPA 1977.

3.3.1 Basic material. The basic material shall be in accordance with the requirements specified in Forest Service specification 5100-87.

3.3.3 Thread.

3.3.3.1 Stitch type 503. For stitch type 503 and 504, ASTM D 6193, the aramid thread shall be type I Tex size 35, or type II Tex size 27 of A-A-55217, with 10-14 stitches per inch.

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3.3.3.2 Stitch type 301. For stitch type 301, ASTM D 6193, the aramid thread shall be type I Tex size 50, or type II Tex size 45, of A-A-55217, with 7-12 stitches per inch.

3.3.3.3 Bartacks. The thread for the bartacks shall be type I Tex size 35, or type II Tex size 27, of A-A-55217, with 42 stitches per bartack.

3.3.4 Fastener tape, hook and pile. The hook and pile fastener tape shall conform to 1 inch width, type II, class 1 of A-A-55126. The color of the tape shall be a good approximation of the color of the basic material (see 3.2.1).

3.3.11 Labels. Each shroud shall have a combination identification/instruction/care label.

3.3.11.1 Combination label, NFPA 1977. The combination identification/care label shall meet the product labeling requirements of NFPA 1977 for laundering and dry cleaning. The label shall include the following warning and information printed in letters at least 1/16th inch in height:

SHROUD, FACE AND NECK, WILDLAND FIRE

CONTRACT NUMBER: [] ^{1/}

NSN: [] ^{1/}

NAME OF MANUFACTURER: [] ^{1/}

DATE OF MANUFACTURE: [mm/yy] ^{1/}

- a. Machine wash hot. NO BLEACH.
- b. Wash separately from flammable, lint-producing fabrics.
- c. Rinse thoroughly. Soap or detergent residues will burn.
- d. DO NOT STARCH. Starch will burn.
- e. Tumble dry medium. Remove garment promptly.
- f. Do not use fabric softener in wash or static reducing product in dryer.

DO NOT REMOVE THIS LABEL

THIS WILDLAND FIRE FIGHTING PROTECTIVE FACE/NECK SHROUD MEETS THE SHROUD REQUIREMENTS OF NFPA 1977, STANDARD ON PROTECTIVE CLOTHING AND EQUIPMENT FOR WILDLAND FIRE FIGHTING, 1998 EDITION.

^{1/} The manufacturer shall insert the applicable information.

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3.3.11.2 Combination label, non-NFPA 1977. The combination identification/care label shall meet the product labeling requirements of NFPA 1977 for laundering and dry cleaning. The label shall include the following warning and information printed in letters at least 1/16th inch in height:

SHROUD, FACE AND NECK, WILDLAND FIRE

CONTRACT NUMBER: []^{1/}

NSN: []^{1/}

NAME OF MANUFACTURER: []^{1/}

DATE OF MANUFACTURE: [mm/yy]^{1/}

- a. Machine wash hot. NO BLEACH.
- b. Wash separately from flammable, lint-producing fabrics.
- c. Rinse thoroughly. Soap or detergent residues will burn.
- d. DO NOT STARCH. Starch will burn.
- e. Tumble dry medium. Remove garment promptly.
- f. Do not use fabric softener in wash or static reducing product in dryer.

DO NOT REMOVE THIS LABEL

THIS WILDLAND FIRE FIGHTING PROTECTIVE FACE/NECK SHROUD MEETS THE REQUIREMENTS OF FOREST SERVICE SPECIFICATION 5100-601, FACE AND NECK SHROUD.

^{1/} The manufacturer shall insert the applicable information.

3.4 Patterns. Standard patterns (MTDC-989) will be furnished by the Government. The standard patterns shall not be altered in any way and shall be used only as a guide for cutting the contractor's working patterns. The contractor's working patterns shall be identical to the standard patterns.

3.5 Construction.

3.5.1 Stitches, seams and stitching. Stitch, seam, and stitching types, as specified in MTDC-989, shall conform to ASTM D 6193. Seam allowances shall be maintained with seams sewn so that no raw edges, runoffs, twists, pleats, puckers or open seams will result. All seams shall start and finish evenly. Thread tension shall be maintained so that there is no tight or loose stitching.

3.5.1.1 Overedge stitching. The gage of overedge stitching and the overedge portion of safety stitching shall be 3/16 to 1/4 inch. The guides and knives for the safety stitch and overedge machines shall be set to trim only the raveled edges of the fabric.

3.5.1.2 Thread breaks and ends of seams. Ends of all seams and stitching produced with 301 stitch type, when not caught in other seams or stitching, shall be backtacked not less than 1/2 inch. Thread breaks (all stitch types) shall be secured by stitching back of the break not less than 1/2 inch.

3.5.2 Bartacks. Bartacks shall be 3/4 ±1/16 inch long, 1/8 ±1/32 inch wide and contain 42 stitches.

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3.6 Deviations and waivers. Deviations and waivers to the materials or construction specified herein shall not be allowed unless authorized in writing by the administrative contracting officer.

3.7 Workmanship. The finished shrouds shall conform to the quality of product established by this specification. The occurrence of defects shall not exceed the applicable acceptable point values. The finished shroud shall conform to NFPA 1977 requirements for protective face and neck shroud.

3.8 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch/pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

3.9 Recovered materials. The contractor is encouraged to use recovered material in accordance with Federal Acquisition Regulation 23.4 to the maximum extent practical.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.1.3 Certification of compliance. Unless otherwise specified, certificates of compliance supplied by the manufacturer of the item, component, or material, listing the specified test method and test results obtained, may be furnished in lieu of actual lot by lot testing performed by the contractor (see 4.3.2). When certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

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4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with ANSI/ASQC Z1.4. The inspection level and acceptable quality level (AQL) shall be as specified. All shrouds manufactured at one time shall be considered a lot for purposes of acceptance inspection and test. A sample unit shall be one complete shroud.

4.3 Quality conformance inspection. Each end item lot shall be sampled and inspected as specified in 4.3.4.1 and 4.3.4.2. The packaging shall be sampled as specified in 4.4. Unless otherwise specified (see 6.2), first articles submitted in accordance with 3.1 shall be inspected as specified in 4.3.4.1 and 4.3.4.2. Packaging and packing is not part of the first article inspection. The presence of any defect or failure to pass any test shall be cause for rejection of the first article.

4.3.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3.2 Certification. Unless otherwise specified (see 6.2), as part of first article presentations and lot inspections, it shall be acceptable for the contractor to provide certificates of compliance for all materials and components in lieu of actual lot by lot testing. In addition, when the contractor changes component or material suppliers, a new certification based on actual test results shall be required. All certificates shall include as a minimum:

- Specification, type, class, form, etc. as applicable
- Quantity purchased
- Purchase source, address, and telephone number
- Purchase date
- Lot number traceable to materials used in production
- Contract number

4.3.3 In-process inspection. Inspection shall be made at any point or during any phase of the manufacturing process to determine whether cut lengths, cut parts, markings for location of components, and location of assembled component parts are in accordance with specified requirements. Inspection shall be made to determine that holes drilled for location marking do not exceed 0.076 inch diameter and are placed in such a manner that each shall be covered in the finished item (see 3.3.4). Whenever nonconformance is noted, corrections shall be made to the parts affected and lot in process. Components that cannot be corrected shall be removed from production.

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4.3.4 End item examination.

4.3.4.1 End item visual examination. The end items shall be examined for the defects list in table I on a lot by lot basis. The lot size shall be expressed in units of complete face and neck shrouds. The inspection level shall be S-3, and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 15.0 for combined major and minor defects. Unless otherwise specified, defects shall be scored on an individual basis, i.e., each seam, each stitching end, each dimension, etc.

TABLE I. End item visual defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Aramid cloth	Not type specified	X	
	Any hole (except location marks), cut or tear	X	
	Any abrasion mark, smash, slub, broken or missing yarn, multiple float, or open place, clearly visible at normal inspection distance (3 feet)	X	
	Needle chew		X
	NOTE: Needle holes visible as the result of broken or skipped stitching or stitching that has been removed shall not be considered as needle chews providing that the holes are spaced as in normal stitching.		
	Color not as specified	X	
	Shade bar, fine or coarse filling bar		X
	Coating defective or partially omitted		X
Fastener tape	Size or type not as specified	X	
	Location not as specified	X	
	Color not as specified	X	
Thread	Type, class, or size not as specified	X	
	Color not as specified		X
Raw edge (on edge required to be finished)	More than 1/2 inch when securely caught in stitching		X
NOTE: Raw edge not securely caught in stitching shall be classified as an open seam.			
Run-off (see open seam)			
Seams and stitch type	Seam or stitch type not as specified	X	

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TABLE I. End item visual defects - Continued

Examine	Defect	Classification	
		Major	Minor
Bartacks	One or more bartacks omitted		X
	Any bartack not as specified or not in specified location	X	
	Stitching loose, incomplete, or broken		X
Stitch tension	Loose, resulting in loose bobbin or top thread	X	
	Excessively tight, resulting in puckering of material	X	
	NOTE: Defects to be scored only when the condition exists for a continuous 4 inches or more, or in several areas with an accumulated distance of 8 inches or more. Applicable to individual seams.		
Stitches per inch	Up to two stitches less than minimum specified		X
	Three or more stitches less than minimum specified	X	
	Two or more stitches in excess of maximum specified	X	
	NOTE: Variation in the number of stitches per inch caused by the operator speeding up the machine and pulling the cloth in order to sew over heavy places or in turning corners shall be classified as follows: (a) Within the minor defect classification - no defect (b) Within the major defect classification - minor defect Defect to be scored only when condition exists on any one seam for a length of 6 inches or more or when the combined length of several areas exceeds 10 inches.		
Stitching margin (not otherwise classified)	Exceeds specified tolerance, up to 1/16 inch	X	
	Exceeds specified tolerance, over 1/16 inch	X	
	NOTE: Defects to be scored only when the condition exists for 4 inches or more or in several areas with an accumulated distance of 8 inches or more. Applicable to individual seams.		
Stitching gauge	Not as specified	X	
Stitching ends	Not secured as specified	X	

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TABLE I. End item visual defects - Continued

Examine	Defect	Classification	
		Major	Minor
Thread breaks, skipped stitches, or run-offs (unless otherwise classified herein)	Not overstitched as specified	X	
	NOTE: Thread breaks or two or more consecutive skipped stitches or run-offs not overstitched shall be classified as open seams.		
Rows of stitching	Any row missing except on box-x stitching	X	
	On box-x stitching:		
	- One row of stitching omitted		X
	- Two or more rows of stitching omitted	X	
Automatic stitching	Stitching ends not backstitched patterns as specified, i.e., less than three tying, overlapping, or backstitches	X	
Components and assembly	Any component part omitted or not as specified or any operation omitted or not as specified (unless otherwise classified herein)	X	
	Needle chews	X	
	Any mend, darn, patch, splice, or other unauthorized repair	X	
	Any material pleated or caught in stitch line where not specified		X
Piecing	Any piecing or splicing except as specified	X	
Cleanness	Grease, oil, dirt, ink, or other stains clearly noticeable	X	
	Thread ends not trimmed to 1/4 inch or less	X	
Identification and cleaning label	Type or class not as specified	X	
	Incorrect type size or information	X	
	Not in location specified	X	
	Incorrect label margins	X	
Location markings	Drill mark exceeding size specified	X	
	Drill mark not covered on finished item		X
	Printed marking more than 1/32 inch in width or not covered by component part	X	

4.3.4.2 End item dimensional examination. End items shall be examined for the defects listed in table II on a lot by lot basis. Only those dimensions that can be evaluated without damaging or disassembling the end items shall be examined. The inspection level shall be S-3. An AQL, expressed in terms of defects per hundred units, shall be 6.5 major defects and 15.0 for combined major and minor defects.

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TABLE II. End item dimensional defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Dimensions (overall)	Smaller than nominal dimensions less applicable minus tolerance indicated on drawings, but not smaller than nominal dimensions less twice the applicable minus tolerances		X
	Smaller than nominal dimensions less twice the applicable minus tolerance	X	
	Larger than nominal dimensions and applicable plus tolerance		X
Component and location dimensions (not otherwise classified herein)	Not within specified tolerance		X
Stitch margin and gauge	Not within specified tolerance		X

4.4 Packaging inspection. An examination shall be made to determine that packing and marking comply with the section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged except that it shall not be palletized and it need not be closed. Shipping containers fully packaged that have not been palletized shall be examined for defects in closure. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 and the AQL shall be 2.5 defects per hundred units.

<u>Examine</u>	<u>Defect</u>
Markings	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application.
Materials	Any component missing or not as specified. Any component damaged, affecting serviceability.
Workmanship	Inadequate application of components, such as: incomplete closure of container flaps, improper taping, loose strapping, inadequate stapling.
Contents	Bulged or distorted container. Number per container is more or less than required.

5. PREPARATION FOR DELIVERY

5.1 Preservation. Preservation shall be in accordance with ASTM D 3951 and as specified in the contract or purchase order (see 6.2).

5.1.1 Packaging. Each face and neck shroud shall be neatly folded, inserted to a plastic bag and sealed.

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5.2 Packing. Twenty (20) face and neck shrouds, packaged as specified in 5.1.1, shall be packed into a close-fitting fiberboard box, minimum burst strength 250 psi . Boxes shall be type CF (variety SW) or type SF, class domestic, style RSC meeting the requirements of the latest version of ASTM D 5118. Boxes shall be in compliance with the National Motor Freight Classification. Each box shall be closed in accordance with the latest version of ASTM D 1974 except that the inspection shall be in accordance with 4.4.

5.3 Marking. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123.

6. NOTES

6.1 Intended use. The face and neck shroud is intended for use by wildland firefighters to protect the lower face and neck from radiant heat. It is designed to attach to, and drape from, the wildland firefighter's helmet.

6.2 Ordering data. Documents utilizing this material should specify the following:

- (a) Title, number and date of this specification.
- (b) If shroud is to meet all NFPA 1977 requirements, or if it is to meet all of NFPA except for ISO registration and labeling (see 3.2 and 3.11).
- (b) When first article samples are not required (see 3.1, 4.3, and 6.4).
- (c) When lot by lot testing is required in lieu of certificates of compliance (see 4.3.2).
- (d) Preservation, packing, and marking required in addition to specification requirements (see section 5).

6.3 First article. When first articles are required, they shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation 52.209. The first article shall consist of three completely assembled face and neck shrouds covered under this specification and shall be preproduction samples. The contracting officer should include specific instructions regarding arrangements for selection, inspection, and approval of the first articles.

6.4 Notice. When Government drawings, specifications or other data are used for any other purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.5 Preparing Activity. USDA Forest Service, Missoula Technology and Development Center (MTDC), Building 1, Fort Missoula, Missoula, Montana 59804-7294.

Standardization Document Improvement Proposal

This form is provided to solicit beneficial comments that may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, and users are invited to submit comments to:

USDA Forest Service
Missoula Technology and Development Center
Bldg. 1, Fort Missoula
Missoula, MT 59804-7294

Attach any additional pertinent information that may be of use in improving this document to this form and mail in an envelope. A response will be provided when the submitter includes their name and address.

NOTE: This form shall not be used to submit requests for waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the document, or to amend contractual requirements.

Document Identification: **5100-601A - SHROUD, FACE AND NECK, WILDLAND FIRE**

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